Space Weather Forecast

Issued on Wednesday, 08 February 2023 at 01:24 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further Moderate flares likely during the period.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is at Moderate levels with four Moderate-class flares observed in the past 24-hours. The peak flare was from AR3213 near the centre disc in the northern hemisphere. This is one of eight sunspots currently on the visible disc. The most developmental regions are currently in the central northern hemisphere and also in the northeast quadrant. The former is a moderately large and complex region, whilst the region to the south is larger, but magnetically simpler at this time. A large filament, which is a line of plasma held together by the Sun's magnetic field that can be a source of coronal mass ejections (CMEs), is also present across the southwestern hemisphere, however this currently appears stable. No Earth-directed CMEs have been observed. The trajectory of a CME from the centre disc northern hemisphere resulting from a flare peaking at 07/1232 UTC has been assessed, but is expected to be directed above Earth's orbit.

Solar Wind / Geomagnetic Activity: Solar winds are currently at elevated to slightly elevated levels, having increased earlier in the UTC day due to Earth interacting with the fast wind from two coronal holes in the far northwest disc and subsequently decreasing later. Observed speeds increased from 450-500 km/s to peak at 550-600 km/s around 07/0800 UTC, before easing to around 470-510 km/s by the end of the period. The magnetic field strength, was Moderate at first, but decreased to Weak from around 07/1600 UTC. The important north-south component was variable, but more generally southward directed (negative). Geomagnetic activity was Unsettled to Active (Kp 3-4).

Energetic Particles / Solar Radiation: The count rate of energetic particles is at Background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected, with a slight chance of High levels being reached, mainly owing to the developing sunspots in the northern hemisphere, as well as further regions expected to rotate onto the disc during the period.

Solar Wind / Geomagnetic Activity: CMEs which left the Sun on the 4th, 5th and 7th, while forecast to miss the Earth, give a low chance of glancing interactions between Days 1-4 (8th-11th). Otherwise, the ongoing elevated solar winds due to the fast wind enhancement from two coronal hole high-speed streams are forecast to gradually ease, with no other coronal hole sourced enhancements expected. Mainly Quiet to Unsettled geomagnetic activity is expected, however given current fast winds and the low confidence CME outlook, Active intervals are possible on all days. There is a very slight chance of G1/Minor Storm intervals at any time during the period.

Energetic Particles / Solar Radiation: The count rate of energetic particles is expected to remain at background levels, but there is a slight chance of a minor solar radiation storm on Day 1 (8th) owing to the Moderate flare observed at 07/2307 UTC.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	50	50	50	50
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	5	5	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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